

CLAIMS

What is claimed is:

1. (Currently amended) A nucleic acid sequence comprising:

$P_x-S_x-B_n-(ZR)-\text{transport peptide}-(Z_1Z_2)-\text{protein}(Y)-\text{protein}(Y_m)-T$;

wherein:

the nucleic acid codes for a fusion protein comprising a peptide encoded by transport peptide linked via a peptide encoded by a first Z_1Z_2 to a protein encoded by said protein(Y) which is linked to T when m equals zero, or when m does not equal zero, is linked to a peptide encoded by a second Z_1Z_2 which is linked to a chain comprising at least one and up to 5 proteins encoded by protein(Y_m), which either correspond to the protein encoded by said protein(Y) or can be different from the protein encoded by said protein(Y);

the peptide encoded by transport peptide improves the rate of secretion of the protein encoded by said protein(Y) and the protein encoded by said protein(Y_m), when the protein encoded by said protein(Y_m) is present;

P_x comprises a promoter sequence;

S_x comprises a nucleic acid sequence encoding a signal or leader sequence;

B_n is 4 to 15 codons, when n is an integer from 1 to 15, or a chemical bond, when $n=0$;

Z is a codon for lysine or arginine;

R is an arginine codon;

transport peptide comprises a nucleic acid sequence encoding hirudin;

Z_1 is a codon for lysine or arginine or a portion thereof or a chemical bond when Z_1 and Z_2 combine to make the second Z_1Z_2 and $m=0$;

Z_2 is a codon for lysine or arginine or a portion thereof or a chemical bond when Z_1 and Z_2 combine to make the second Z_1Z_2 and $m=0$;

~~protein(Y_m) comprises a nucleic acid sequence encoding at least one and up to 5 proteins that are produced and secreted by yeast when m is an integer from 1 to 5, or is a chemical bond when $m=0$;~~

protein(Y), selected from the group consisting of mini-proinsulin[[,]] and proinsulin, ~~interleukin, lymphokine, interferon and blood clotting factor,~~ comprises a nucleic acid sequence encoding a protein that is produced and secreted by yeast ~~and whose biological activity, when protein(Y_m) is not a chemical bond, is not impaired by a basic dipeptide extension encoded by the first or second Z_1Z_2 or allows degradation of the basic dipeptide extension by carboxypeptidase;~~ and

T is an untranslated expression-enhancing nucleic acid sequence.

Claims 2 - 5. (Canceled).

6. (Original) A multicopy vector comprising the nucleic acid of claim 1.

7. (Original) A plasmid comprising the nucleic acid of claim 1.

8. (Original) A host cell comprising the nucleic acid of claim 1 as a part of the host cell chromosome, as a part of a mini-chromosome, or extra-chromosomally.

9. (Original) The host cell of claim 8, wherein the host cell is a yeast.

10. (Original) The host cell of 9, wherein the yeast is selected from *Saccharomyces cerevisiae*, *Kluyveromyces fragilis*, *Hansenula polymorpha*, and *Pichia pastoris*.

11. (Original) A host cell comprising the multicopy vector of claim 6.

12. (Original) A host cell comprising the plasmid of claim 7.

Claims 13-26. (Canceled)

27. (New) An engineered host cell comprising the nucleic acid of claim 1 as a part of the host cell chromosome, as a part of a mini-chromosome, or extra-chromosomally.

28. (New) An engineered host cell comprising the multicopy vector of claim 6.

29. (New) An engineered host cell comprising the plasmid of claim 7.